

Applicant : Birang et al.
Serial No. : 10/721,769
Filed : November 24, 2003
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Attorney's Docket No.: 05542-516001 / 7901/CMP

Amendments to the Drawings:

The attached five replacement sheets of drawings include changes to FIG. 7 and replace the original eight sheets including FIGS. 1, 2, 3, 4, 5a, 5b, 6, and 7. In FIG. 7, the missing information has been added to the empty boxes and ovals.

Attachments following last page of this Amendment:

Replacement Sheets (5 pages)

REMARKS

Claims 1-24 and 26-35 were pending. Claim 25 was erroneously never submitted. Claims 19-21, 23, and 26-34 were withdrawn from consideration in response to a restriction requirement. Claims 12 and 24 are allowed. Claims 5 and 10 are objected to. Claims 1-4, 6-9, 11-18, 22, and 35 stand rejected. The applicant canceled without prejudice claims 6, 19-21, 23, and 25-34. The applicant amended claims 1, 11, 13-18, 22, and 35. The applicant added claims 36-41. Claims 1-5, 7-18, 22, 24, 35 and 36-41 are now pending, of which claims 1, 12, 22, 24, and 35 are independent. The applicant respectfully requests reconsideration in view of the amendments and following remarks.

DRAWINGS

Applicant submits replacement sheets of drawings that include FIGS. 1, 2, 3, 4, 5a, 5b, 6, and 7. The applicant amended FIG. 7 as the Examiner suggested.

CLAIM OBJECTIONS

The applicant amended claims 13-18 to depend from claim 12 instead of claim 11 as the Examiner suggested.

SECTION 102 REJECTIONS

Claim 1 stands rejected under 35 U.S.C. Section 102(e) as being anticipated by U.S. Patent No. 6,829,054 B2 to Stanke et al. ("Stanke"). The applicant amended claim 1, which now recites a method for closed loop control in chemical mechanical polishing using an inline metrology station. The method includes determining at least one polishing parameter from the measured dielectric thicknesses so that a uniformity of metal feature thicknesses is increased with subsequent polishing, the determining being based on a model in which a thickness of a metal feature in an array is proportional to a dielectric thickness in the array."

The applicant respectfully submits that Stanke does not disclose or suggested the above limitation of claim 1. Stanke discloses an optical profiler integrated with a polisher. *See* col. 6, lines 49-54. The profiler measures a profile, residual copper, and oxide thickness at

predetermined locations of a wafer. *See* col. 4, lines 7-12. The profiler reports the measurement results to a control system that adjusts polishing machine control parameters for subsequent wafers and for subsequent polishing of the current wafer. *See* col. 4, lines 12-16. However, Stanke fails to disclose or suggest “determining at least one polishing parameter from the measured dielectric thicknesses so that a uniformity of metal feature thicknesses is increased with subsequent polishing, the determining being based on a model in which a thickness of a metal feature in an array is proportional to a dielectric thickness in the array,” as required by claim 1. There is simply no contemplation in Stanke of the claimed model, in which a thickness of a metal feature in an array is proportional to a dielectric thickness in the array. For at least this reason, the applicant respectfully submits that claim 1 and claims depending from claim 1 should be allowed.

Claim 22 stands rejected under 35 U.S.C. Section 102(e) as being anticipated by Stanke. Claim 22 recites a method for closed loop control in chemical mechanical polishing using an inline metrology station. The method includes “operating the controller to determine at least one polishing parameter from the measured dielectric thicknesses so that a uniformity of metal feature thicknesses is increased with subsequent polishing, the determining being based on a model in which a thickness of a metal feature in an array is proportional to a dielectric thickness in the array.” For at least the reason discussed above for claim 1, the applicant respectfully submits that claim 22 and claims depending from claim 22 should be allowed.

Claim 35 stands rejected under 35 U.S.C. Section 102(e) as being anticipated by Stanke. Claim 35 recites a method for closed loop control in chemical mechanical polishing using an inline metrology station. The method includes “determining at least one polishing parameter from the measured dielectric thicknesses so that a uniformity of metal feature thicknesses is increased with subsequent polishing, the determining being based on a model in which a thickness of a metal feature in an array is proportional to a dielectric thickness in the array.” For at least the reason discussed above for claim 1, the applicant respectfully submits that claim 35 should be allowed.

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NEW CLAIMS

New claims 36-41 are similar to claims 13-18. Claims 36-41 depend from claim 24 and are allowable for at least the reasons that that claim 24 was allowed.

The applicant respectfully requests that all pending claims be allowed. Please apply the one-month extension of time fee in the amount of \$120.00 and any other appropriate charges or credits to deposit account 06 1050.

Respectfully submitted,

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